

Claims:

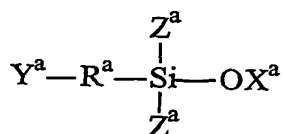
1. A curable organosilicate composition that is usefully employed in the formation of a hardmask, etchstop, antireflective, adhesion promoting, or other layer in the fabrication of electronic devices comprising:

- (a) an alkoxy or acyloxy silane having at least one group containing ethylenic unsaturation which group is bonded to the silicon atom
- (b) an alkoxy or acyloxy silane having at least one group containing an aromatic ring which group is bonded to the silicon atom,
- (c) a latent acid catalyst, and
- (d) optionally an alkoxy or acyloxy silane having at least one C₁-C₆ alkyl group bonded to the silicon atom.

2. The composition of claim 1 wherein the first silane (a) is a vinyl acetoxysilane and the second silane (b) is an arylalkoxysilane.

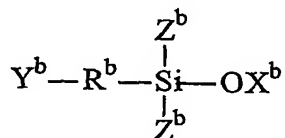
3. The composition of claim 1 wherein the combination comprises

- (a) 50-95 mole percent silanes of the formula



wherein R^a is C₁-C₆ alkylidene, C₁-C₆ alkylene, arylene, or a direct bond; Y^a is C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂₋₆ alkynyl, C₆-C₂₀ aryl, 3-methacryloxy, 3-acryloxy, 3-aminoethyl-amino, 3-amino, -SiZ^a₂OX^a, or -OX^a; X^a is independently, in each occurrence, a C₁-C₆ alkyl or C₂-C₆ acyl; and Z^a is C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂₋₆ alkynyl, C₆₋₂₀ aryl, or -OX^a, with the proviso, that at least one of Y^a, Z^a or X^a is ethylenically unsaturated,

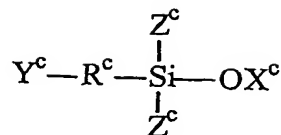
- (b) 5 to 40 mole percent



wherein R^b is C₁-C₆ alkylidene, C₁-C₆ alkylene, arylene, or a direct bond; Y^b is C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂₋₆ alkynyl, C₆-C₂₀ aryl, 3-methacryloxy, 3-acryloxy, 3-aminoethyl-amino, 3-amino, -SiZ^b₂OX^b, or -OX^b; X^b is independently, in each occurrence, a C₁-C₆ alkyl or C₂-C₆ acyl; and Z^b is C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂₋₆ alkynyl, C₆₋₂₀ aryl, or -OX^b, provided at least one of Y^b, Z^b or X^b comprises an aromatic ring,

- (c) a latent acid catalyst; and

- (d) 0 to 45 mole percent



wherein R^c is C₁-C₆ alkylidene, C₁-C₆ alkylene, arylene, or a direct bond; Y^c is C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂₋₆ alkynyl, C₆-C₂₀ aryl, 3-methacryloxy, 3-acryloxy, 3-aminoethyl-amino, 3-amino, -SiZ^c₂OX^c, or -OX^c; X^c is independently, in each occurrence, a C₁-C₆ alkyl or C₂-C₆ acyl; and Z^c is C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂₋₆ alkynyl, C₆₋₂₀ aryl, or -OX^c, provided at least one of Z^c or the combination of R^c-Y^c comprises a C₁₋₆ alkyl group,

said mole percent is based on total moles of silanes (a), (b) and (d) present.

4. The composition of claim 1 comprising both a photoacid generator and a thermal acid generator.
5. The composition of claim 1 wherein the group containing an aromatic ring is a phenyl or anthracenyl group.
6. The hydrolyzed or partially hydrolyzed product of a combination of silanes according to any one of claims 1-5
7. A method comprising
providing a substrate,
forming a first layer on the substrate, wherein the first layer has a dielectric constant of less than 3.0 and comprises an organic, inorganic or hybrid polymer,
applying an organosilicate composition over the first layer, and
hydrolyzing (curing) the organosilicate composition to form an organosilicate resin layer,
characterized in that the organosilicate composition is a composition according to any one of claims 1-5.
8. A method according to claim 7 wherein multiple layers of the organosilicate composition are formed and cured.
9. A method of forming an antireflective coating on a substrate comprising:
providing a substrate,
applying an organosilicate composition in a layer over at least a portion of the substrate or over one or more intermediate layers applied over said substrate, and
hydrolyzing (curing) the organosilicate composition to form an organosilicate resin, characterized in that the organosilicate composition is a composition according to any one of claims 1-5.
10. A method according to claim 9 wherein multiple layers of the organosilicate composition are formed and cured.